

NEW BYTHITID FISH, *DINEMATICHTHYS MINYOMMA*, FROM THE CARIBBEAN SEA

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ABSTRACT. *Dinematichthys minyomma* is described as a new species, based on a single collection of 51 specimens from a coral reef in the Bay Islands, Honduras. It is tentatively assigned to the genus on the basis of a single character, the position of the anterior nostril high on the snout. Unique diagnostic characters include a small eye (10.2–15 in head), few lateral scale rows (79–89), few dorsal fin rays (73–80), and few anal fin rays (55–62).

INTRODUCTION

The specimens here described were collected some 20 years ago, and their lack of a name has been recognized for nearly as long. The chief reason for their anonymity has been uncertainty about appropriate generic placement. Although this uncertainty remains, the problem is now better defined, and we describe this species in order to provide a name for use in forthcoming studies, and to call attention to the species's existence.

METHODS

Counts of vertebrae were taken from radiographs, and exclude the ural centrum. Dorsal and anal fin ray counts were also taken from radiographs, and include the last unsupported ray. Caudal fin ray counts include principal and procurent rays. Measurements are to the nearest 0.1 millimeter. Eye measurements were taken on the spectacle. Lateral scale row counts were taken along a midlateral pale line originating near the opercular angle. Because the scales are deciduous, it is not possible to obtain exact counts for all specimens, so minima and maxima, including counts of scale pockets where possible, are reported for these individuals. Clearing and staining methods followed Dingerkus and Uhler (1977). Figure 2 was drawn with a camera lucida.

The term "sclerified" is used here in its most general sense (Wake, 1979) to refer to the hardening that occurs in the tissues of the copulatory apparatus of these fishes ("ossified" of Cohen and Nielsen, 1978). Staining failed to indicate the presence of cartilage or bone in any of these tissues except

the penis (see below). Because only one specimen was cleared and stained, the possibility cannot be ruled out that the failure of these tissues to stain is an artifact of preservation, though this is not indicated by the quality of the staining of the other tissues in the specimen. In any case, a more precise characterization of these tissues cannot be made without clearing and staining of additional specimens or, possibly, histological studies of fresh specimens.

All other methods follow Cohen and Nielsen (1978).

Abbreviations: USNM: National Museum of Natural History; LACM: Natural History Museum of Los Angeles County; TABL: U.S. National Marine Fisheries Service Tropical Atlantic Biological Laboratory, Miami; SL: standard length.

GENERIC PLACEMENT

The tribe Dinematichthyini of the bythitid subfamily Brosmophycinae as defined by Cohen and Nielsen (1978) contains nine nominal genera, including *Dinematichthys*. The problematical status of *Dinematichthys* is discussed in detail by Cohen and Nielsen (1978), who noted that there are no known extant specimens of the type species, *D. ilucoeteoides* Bleeker, 1855, and that none of the numerous literature records for the species agrees with the original description. Although several species have at one time or another been assigned to *Dinematichthys*, Cohen and Nielsen (1978) restricted the genus to the type species. They further defined *Dinematichthys* on the basis of the following six characters: caudal fin free from the dorsal and anal fins, male intromittent organ with two pairs of ossified pseudoclaspers, opercle with a sharp-pointed spine, seven branchiostegal rays, imbricate body scales, and an anterior nostril high above the upper lip. Of these, only the last is diagnostic for the genus; the other

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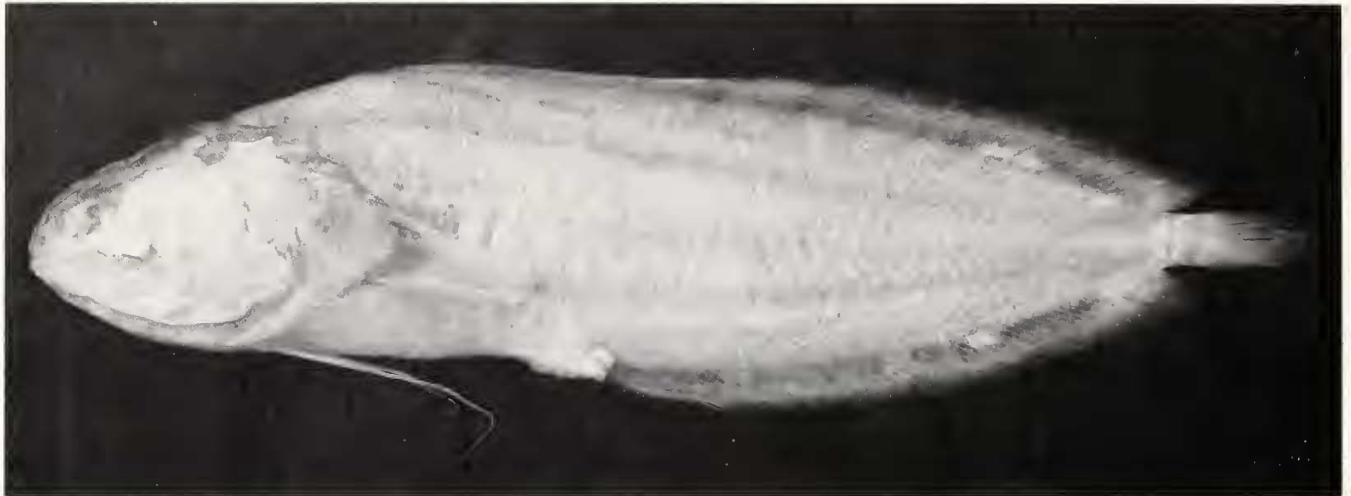


Figure 1. *Dinematchthys minyomma*, paratype, USNM 280123, 71 mm SL, male, lateral view.

characters may be shared by the nominal dinematchthyine genera *Ogilbia*, *Brotulina*, and *Monothrix*. It is on the basis of this one diagnostic character that the species here described is provisionally placed in *Dinematchthys*.

In addition to the type species, knowledge of which is based solely on the original description, the genus presently contains one other species, *D. dasyrhynchus* Cohen and Hutchins, 1982. Because a single diagnostic character does not provide convincing evidence of monophyly among these three species, we stress that the placement of *D. minyomma* in *Dinematchthys* is provisional.

Dinematchthys minyomma new species

Figures 1–3

DIAGNOSIS. A *Dinematchthys* that differs from *D. ilucoeteoides* and *D. dasyrhynchus* in having a smaller eye (10.2–

15 vs. 5 and 6.9–9.4 in head), fewer lateral scale rows (79–89 vs. 100 and 140), fewer dorsal fin rays (73–80 vs. 83 and 96–103), and fewer anal fin rays (55–62 vs. 69 and 62–69). It further differs from *D. ilucoeteoides* in having an unsheathed maxillary, and from *D. dasyrhynchus* in having fewer vertebrae (10 + 28–30 vs. 13–14 + 33–34), fewer cephalic pores (19 vs. 22–26), fewer pectoral fin rays (22–24 vs. 25–28), and fewer caudal fin rays (16 vs. 17–18). These differences are summarized in Table 1, and data for the new species are shown in Tables 2 and 3.

STUDY MATERIAL. **Holotype.** USNM 280122, formerly TABL 67-124, 66.1 mm SL, male, collected in the Caribbean Sea, Honduras, Bay Islands, Guanaja (Bonaca) Island, at 16°26'38"N, 85°53'02"W, from a coral reef at 0–9 m, 21 April 1967, by George Miller.

Paratypes. USNM 280123, 38 specimens, 35.5–74.5 mm SL: 12 males, 47.1–74.5 mm SL, 26 females 35.5–70.7 mm

Table 1. Comparison of the three species of *Dinematchthys*.^{1,2}

Character	<i>D. minyomma</i>	<i>D. ilucoeteoides</i>	<i>D. dasyrhynchus</i>
Head length/eye diameter	10.2–15.0	A little over 5	6.9–9.4
Lateral scale rows	79–89	About 100	About 140
Dorsal fin rays	73–80	83	96–103
Pectoral fin rays	22–24	22–23	25–28
Posterior end of maxillary	Unsheathed	Sheathed	Unsheathed
Vertebrae	10 + 28–30	—	13–14 + 33–34
Anal fin rays	55–62	69	62–69
Caudal fin rays	14 + 2	14	17–18
Lateral pores	1	—	2
Supratemporal pores	0	—	1 or 2
Supraorbital pores	3	—	4
Infraorbital pores	5	—	6, 7 or 8

1. Data for *D. ilucoeteoides* and *D. dasyrhynchus* are taken from the original descriptions; data for *D. minyomma* are summarized for all 51 type specimens.

2. Measurements in mm.

Table 2. Data for selected specimens, and summary data for 18 male and 32 female specimens of *Dinematichthys minyomma*.¹

	Males, summary	USNM 280122	USNM 280123	USNM 280123	USNM 280123	Females, summary	USNM 280123	USNM 280123	LACM 44201-1	LACM 44201-1
Vert.	10 + 29–30	10 + 29	10 + 30	10 + 29	10 + 29	10 + 28–30	10 + 29	10 + 29	10 + 29	10 + 29
D. rays	74–79	75	79	76	76	73–80	77	73	75	73
A. rays	56–61	58	59	59	57	55–62	58	55	57	56
P. rays	22–23	23	23	22	23	22–24	23	23	23	23
L. scale rows	81–86	84		81–85	84–86	79–89	79–82		87–89	
G. rakers total	2–4 + 12–16	3 + 16	3 + 14	3 + 13	2 + 12	2–4 + 10–16	4 + 14	2 + 16	2 + 13	3 + 14
Dev. G. rakers	0–3	1	2	1	3	0–3	2	0	2	3
SL	47.1–74.5	66.1	61.5	72.3	54.1	35.5–70.7	57.7	68.8	61.0	52.1
Depth		14.4	13.6	15.7	10.8		12.9	15.5	13.5	11.2
Pre-dorsal		21.6	21.2	24.2	16.4		18.7	23.6	19.8	18.0
Pre-anal		32.8	31.3	36.3	26.4		28.0	34.4	28.6	26.8
Pect. length		9	8.7	9.5	7.4		7.9	9.7	8.0	7.5
Vent. length		18.5	15.2	17.1	14.0		14.8	17.3		14.2
Head length		19.3	18.0	21.6	15.0		16.3	20.3	17.4	15.9
Eye diameter		1.5	1.4	1.5	1.4		1.4	1.6	1.7	1.2
Snout length		4.3	4.3	5.2	3.5		3.9	5.0	4.1	3.9
U. jaw length		10.1	10.0	10.7	7.6		8.3	11.0	9.0	7.5
G. max. width		3.6	3.8	3.4	2.7		3.0	3.6	3.2	2.5

1. Measurements in mm.

SL; collected with the holotype. LACM 44201-1, 12 specimens, 52.1–70.8 mm SL; 6 males, 53.3–70.8 mm SL, 6 females, 52.1–70.5 mm SL; collected with the holotype. One LACM male specimen, 63.3 mm SL, was cleared and double-stained.

Description. Body compressed, elongate, deepest at or near origin of dorsal fin, depth at vent averaging 4.8 in standard length. Dorsal profile sloping gradually downward to rounded snout. Snout and lower jaw fleshy, with dermal folds and cirri. Upper jaw slightly protruding, maxillary expanded and unsheathed posteriorly. Opercle with stout spine pointing caudad, penetrating the skin slightly anterior to the opercular margin, and just ventral to the upper opercular angle. Eye small, sunken, covered at the surface by a round, translucent spectacle that goes 10.2–15 in head. Posterior nostril, adjacent to eye, with a raised rim longest at the medial and ventral margins. Anterior nostril tubular, 1.5 to 2 eye diameters anterior to posterior nostril, same distance above upper lip.

Fleshy snout with a dermal fold inserted at the symphysis of upper jaw about one eye diameter above upper lip, extending ventrally on each side of symphysis to overhang the premaxillary. The dermal flap formed by this fold extends posteriorly along the premaxillary to a point beneath the posterior margin of the anterior nostril. A second dermal fold extends ventrally from insertion at the lateral margin of the anterior nostril; this fold is somewhat produced anteriorly into an elongate lobe hanging down well below the upper lip and slightly below the horizontal extension of the first dermal fold. The second fold extends posteriorly along the upper jaw, to a point ventral to the eye. The edges of these skin folds may appear fringed due to the presence of dermal cirri.

On the lower jaw, a circular fold lies on the inferior surface of the dentary on either side of the symphysis. Just behind this fold a second semicircular fold extends around the anterior tip of the isthmus. As on the upper jaw, these folds are edged with cirri that also extend along the anterior half of the inferior surface of the dentary.

Table 3. Frequency distributions for fin ray and vertebral counts of *Dinematichthys minyomma*.

		Dorsal fin rays								
		73	74	75	76	77	78	79	80	$\bar{x}$
Males		—	2	6	5	2	1	2	—	76.0
Females		5	5	6	6	2	3	—	1	75.3
Total		5	7	12	11	4	4	2	1	75.6
		Anal fin rays								
		55	56	57	58	59	60	61	62	$\bar{x}$
Males		—	1	4	6	6	—	1	—	58.2
Females		1	4	7	5	6	4	—	1	58.0
Total		1	5	11	11	12	4	1	1	58.1
		Pectoral fin rays				Caudal vertebrae				
		22	23	24		28	29	30		
Males		4	14	—		Males	—	15	1	
Females		8	22	1		Females	2	22	4	
Total		12	36	1		Total	2	37	5	

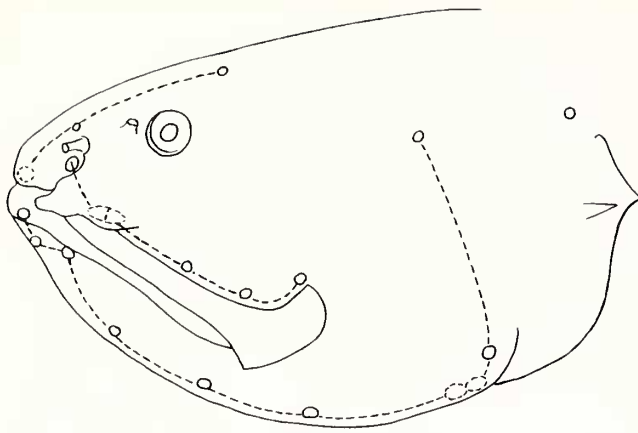


Figure 2. Arrangement of cephalic sensory pores in *Dinematchthys minyomma*, 68.7 mm SL female paratype, USNM 280123. Pores located beneath dermal folds are rendered in broken outlines.

The lateral canal has one pore dorsal to the gill opening (Figure 2). No supratemporal pores. Three supraorbital pores: one large pore (with a diameter about equal to that of the nostril) hidden beneath the first dermal fold that overhangs the upper lip, one small pore medial to the anterior nostril, one posterodorsal to the eye on the frontal region. Five infraorbital pores: one lies lateral to the anterior nostril near the insertion of the second dermal fold on the snout, a second pore (with a diameter about two times that of nostril) lies beneath the flap of skin overhanging the upper lip. The outer edge of this pore is vertically bisected by a septum. Three smaller infraorbital pores are evenly spaced above the posterior half of the upper jaw. Ten preoperculomandibular pores: one large pore in the circular dermal fold on the inferior surface of the dentary, one large pore opening supralaterally within the dermal fold at the tip of the isthmus, one small pore on the anterior outer mandibular margin just beneath the dentary, three small pores spaced along the posterior half of the mandible, two large pores beneath a flap of skin at the angle of the preopercle, one at the preopercular margin just above the angle, one at the juncture with the lateral canal.

Numerous papillae are present on the head, some stout and fleshy, some smaller and less conspicuous; these latter are often obscured by a mucoid covering on some regions of the head. Beginning at the symphysis of the upper jaw: one large papilla at the origin of the first dermal fold on the snout; a second smaller papilla just above the point where this fold meets the upper lip. Beneath the lateral extension of this fold, separated by the third supraorbital pore, are two stalked papillae in a medial position, and three in a lateral position at the posterior end of the fold. Three small papillae surrounding the anterior nostril at the medial, dorsal, and lateral margins. Two small papillae bordering the eye, one on the medial, one on the ventral margin. Two more lie near the medial margin of the posterior nostril, a third medial to these, above the anterior nostril. One small papilla in the infraorbital region, about halfway between the posterior nostril and the upper lip. One small papilla posterodorsal to the eye, three in the interorbital region on each side of the midline.

One on frontal region of the head, just posterior to the first supraorbital pore. One at the dorsal border of the cheek scale patch, in line with the first preopercular pore, five traversing the top of the head from the supraorbital region to the supratemporal region. Three small papillae on opercle: one ventral to the last (tenth) preoperculomandibular pore at the border of the preoperculum, one posterior to the ninth preoperculomandibular pore, one anteroventral to the opercular spine. Two conspicuous papillae near the upper angle of the maxillary at the lower anterior border of the patch of cheek scales: one at the maxillary angle, one along the upper posterior edge of the maxillary. One smaller papilla near the edge of the preoperculum directly posterior to the maxillary, and three small papillae slightly ventral, along the edge of the preoperculum. Seven small papillae distributed irregularly along the mandible. One stout stalked papilla associated with the first preoperculomandibular pore on the dentary.

In addition to the consistent pattern of papillae described above, irregular clusters of numerous smaller papillae may be present on the snout, and near the lower jaw symphysis anterior to the third preoperculomandibular pore.

Lateral line inconspicuous, in two parts. One series of neuromasts originates at the dorsal margin of the head antero-dorsal to the lateral pore, and extends caudad to a point above the anal fin origin. The second, midlateral series originates above the anal fin and extends to the caudal peduncle.

All but the posterior quarter of the premaxillary bears an irregular series of elongate conical teeth along the inner margin. These generally decrease posteriorly in size and density. The outer margin and posterior quarter of the premaxillary are covered by granular teeth. The dentary also bears an outer band of granular teeth and an inner band of sharp conical teeth in an irregular series. On both the premaxillary and the dentary, these conical teeth are generally longest at the medial margin and most densely distributed near the symphysis. The vomer bears a triangular patch of conical teeth, longest at the posterior border. Palatines also with conical teeth in an irregular series, longest at the medial margin.

Each gill arch bears a row of flat plates covered with tiny granular teeth on both the outer and inner surfaces; 0–3 developed rakers on the outer face of the ceratobranchial. Three suprabranchial patches of granular teeth, located between the first and fourth arches on each side. One basibranchial patch of granular teeth between the second and third arch on each side.

Dorsal fin originating over the anterior quarter of the pectoral fin, with four cartilaginous predorsals; anal fin originating about equidistant from snout and caudal fin. In both dorsal and anal fins the posterior rays are longest, all are branched, and the last is unsupported by radials. The caudal fin is slightly rounded. The caudal skeleton has two hypural plates, one parhypural, one epural; each hypural bears one short procurrent ray, and one unbranched and six branched principal rays. The rounded pectoral fin is about one-half the length of the head. Ventral fins are inserted immediately adjacent to each other, more than one eye diameter behind the symphysis of the cleithra; rays nearly reach the vent, or extend beyond it.

Small, overlapping cycloid scales arranged in regular rows cover the body completely, but are lacking on the head except for a large patch on the cheek.

Ribs articulating with the first five centra; subsequent abdominal vertebrae have ribs articulating with parapophyses. Ribs on the third and fourth centra with anterior and posterior flanges.

The male copulatory apparatus (Figure 3) consists of a penis flanked by two pairs of pseudoclaspers, and by an accessory sclerified structure (the accessory cornified body of Turner, 1946). The apparatus is partially covered anteriorly by a thick fleshy genital flap that originates on the posterior margin of the anus. Embedded in the tissue on the inner (dorsal) side of this flap is another sclerified structure, which apparently provides an anchor for dense tissue connections extending from the pseudoclaspers to the genital flap tissue. This structure is clearly discernable only in cleared specimens, although its contours can be traced in the flap tissue of preserved specimens.

The copulatory apparatus is the distal outgrowth of the urogenital sheath. This sheath originates in the sperm duct near the fusion of the two central canals of the testes, and terminates in the hollow, cylindrical penis. The urinary and sperm ducts pass through the urogenital sheath and through the penis, terminating in a pore at the tip of the penis. The penis is cartilaginous, with a ventral ossified portion near the tip.

Although there appear to be two pseudoclaspers on either side of the penis, dissection of the copulatory apparatus revealed that the two are joined at their base (Figure 3b), so they are here referred to as lobes of a single pseudoclasper. The branched pseudoclasper is anchored in the tissue of the lateral wall of the urogenital sheath. The external lobe of the pseudoclasper appears about twice as large as the internal lobe (Figure 3a). The internal lobe appears similar in shape, but has a spur at its anterior margin; however, dissection reveals that the true shape of the internal pseudoclasper lobe (Figure 3b) is obscured by the dense connective tissue of the genital flap.

The posterior edges of the external lobes of the pseudoclaspers are connected distally by a membrane that passes posteriorly around the base of the penis. Attached to this membrane by a thin ligament is the accessory sclerified structure. This large, rounded structure lies either right or left of the midline, skewing the orientation of the penis by slightly displacing its base (Figure 3a).

Color of holotype in alcohol: an overall pale brown, darker on top of head, lighter on sides of head. Bases of dorsal, anal and pectoral fins darker brown; posterior margins of body scales also darker.

REMARKS. Presence of a single pair of unossified branched pseudoclaspers in this species would seem to invalidate the pseudoclaspers, as used by Cohen and Nielsen (1978), as a defining character for the genus. However, the branched pseudoclaspers possessed by all *Dinematichthys*, *Ogilbia*, *Monothrix*, and *Brotulina* species are quite distinct from the unbranched pseudoclaspers present in other *dinematichthyine* species (Sedor, 1985). Clearly, further work is needed to

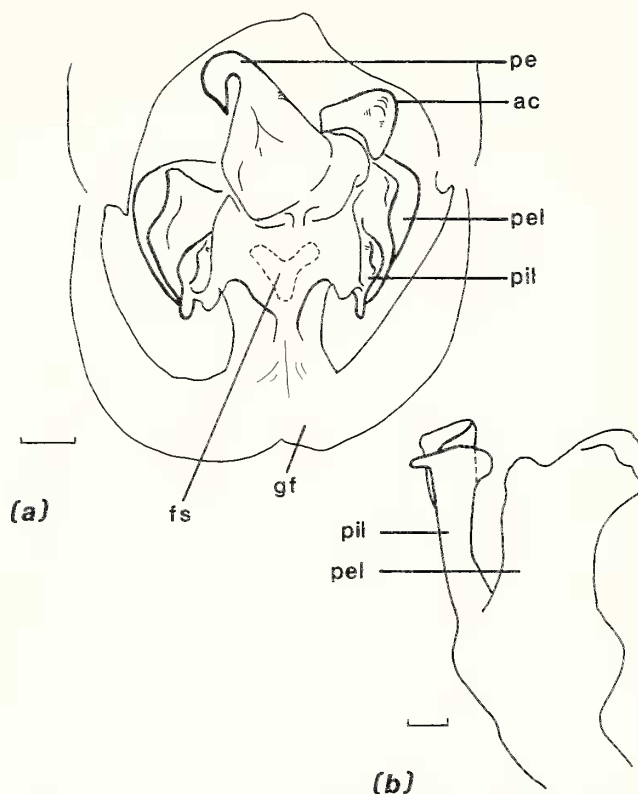


Figure 3. a, *Dinematichthys minyomma* copulatory apparatus, ventral view, 71 mm SL male paratype, USNM 280123. b, dissected right pseudoclasper, lateral view. Abbreviations: ac, accessory body; fs, flap structure; gf, distal tip of genital flap; pe, penis; pel, pseudoclasper, external lobe; pil, pseudoclasper, internal lobe. Bar indicates 0.5 mm.

characterize properly the pseudoclaspers and assess their taxonomic and phylogenetic significance.

ETYMOLOGY. The species is named *minyomma* (from the Greek minys, small and omma, eye) in reference to its small eye, and is treated as a noun in apposition.

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